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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

FCC 96-193

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In the Matter of)

Amendment of the Commission's Rules)
to Provide for Unlicensed NII/SUPERNet)
Operations in the 5 GHz Frequency Range)

ET Docket No. 96-102
RM-8648
RM-8653

REPLY COMMENTS OF MULCAY CONSULTING ASSOCIATES

Pursuant to Section 1.415 of the Commission's Rules and Regulations, Mulcay Consulting Associates (MCA) respectfully submits an original and nine copies of Reply Comments in response to the Notice of Proposed Rule Making (NPRM) in the above referenced proceeding.

1. MCA's INTEREST

MCA is a consulting company with many years of experience in the design, development, operation and marketing of microwave communications equipment and systems. MCA is interested in supporting changes in regulations that promote competition through technological innovation.

2. THE PROPOSED RULE MAKING MUST SUPPORT THE COMMISSION'S GOALS

2.1 The stated goals of the proposed Rule Making are:

- a) To support the creation of new wireless local area networks;
- b) To facilitate wireless access to the National Information Infrastructure;
- c) To permit significant flexibility in the design and operation of the devices;
- d) To limit technical standards to those necessary to prevent interference to other services and to ensure that the spectrum is used efficiently;
- e) To foster the development of a broad range of new devices and services that will stimulate economic growth of new industries;
- f) To promote the ability of U.S. manufacturers to compete globally.

MCA's reply comments will address these six goals.

**3. RULES FOR NII/SUPERNET DEVICES MUST BE COMPATIBLE WITH THE
MARKET NEEDS OF WIRELESS LOCAL AREA NETWORKS AND THE NEEDS
FOR ACCESS TO THE NATIONAL INFORMATION INFRASTRUCTURE**

3.1 To develop rules that support the creation of new wireless local area networks and to facilitate access to the National Information Infrastructure, it is essential to have an understanding of the subject market and especially its physical characteristics.

3.1.1 The Comments of the National Science Foundation's Wireless Field Test for Education Project ("WFTP"), include the results of a series of field tests. WFTP concludes that the major need is for inter-building communications at distances up to 25 miles at data rates between 56kbps and 2 Mbps.

These findings are consistent with MCA's twenty plus years of experience in "Access¹" communications. We have found that

1. Access: Communication between local end users (local loop subscribers) and between end users and the NII (subscribers to a Common Carrier Point-Of-Presence [POP])

in the "Access Market," 95% of communication points are within 10 miles in urban areas and within 50 miles in rural areas. MCA has also found that 95% of "Access" lines are at data rates of 1.544 Mbps or less (price and availability limiting the widespread use of higher data rates).

3.1.2 MCA believes that by increasing "Access Market" competition, through the introduction of innovative NII/SUPERNET devices, this Rule Making can significantly improve the communication options of over 90% of educational institutions, health care providers, libraries, business and other users.

3.2 For any product or service to survive in a competitive market it has to provide superior price, performance or availability, and preferably all three. Over the past twenty years the computer industry, with the benefit of open competition and unhindered innovation, has improved the performance price ratio for computers by several orders of magnitude. Over the same twenty years, the corresponding improvement in the performance price ratio of transmission equipment and services has been minimal. Two reasons are: no meaningful competition to local loop common carriers and restrictive (obsolete) regulations governing the use of the radio frequency spectrum.

3.2.1 WFTP states "Practically speaking there 'is no' real competition (in the local loop)." They also show that the difference in costs can range from 5:1 to 10:1 in favor of non-licensed radios over local common carrier service providers. On the other side of the argument AT&T comments that unlicensed long-range NII/SUPERNet operations would be "unfair to the holders of existing spectrum licenses." Harris Corporation - Farinon Division ("Harris") comments that "Existing microwave (licensed) point-to-point bands will ideally complement NII band operation." Harris also contends that licensed point-to-point services should not be used for distances over 1 kilometer. The Network Equipment Division of the Telecommunications Industry Association ("TIA") comments that "Permitting unlicensed paths exceeding 1-2 kilometers in length is unnecessary."

3.2.3 MCA opposes attempts to limit competition. It is not in the public interest to restrict competition by imposing regulations that prevent new technologies from coming to market.

3.2.5 MCA agrees with the comments of Motorola "unlicensed operations are a necessary complement to licensed systems" and "unlicensed operations solve a collection of communication needs that in all likelihood would go unmet if free and open consumer access to spectrum were not available." MCA does believe that it is in the national interest for the public to be given the opportunity to compare service offerings and licensed and unlicensed products and to choose the best service, product or system for their particular application.

4. FLEXIBILITY IN THE DESIGN AND OPERATION OF NII/SUPERNET DEVICES IS ESSENTIAL

4.1 An Interim Etiquette Should Not be Imposed

No one etiquette is optimum for all applications. MCA therefore agrees with those who are opposed to the implementation of an interim etiquette. For example: Lucent Technologies explains why the proposed interim sharing rules-"The-Listen-Before-Talk" protocol-are particularly ill-suited for NII/SUPERNET devices.

HP comments "The proposed interim etiquette (based on the listen-before-talk) does not support multi media communications and should not be adopted even as a temporary measure." Metricom concludes that a complex spectrum etiquette will significantly constrain the development of products and will not successfully prevent interference.

5. TECHNICAL STANDARDS

5.1 Out-of-Band Emissions

MCA agrees with the proposal to limit out-of-band emissions pursuant to existing rules, such as 15.209 and 15.247. However, MCA believes compelling evidence should be presented to justify any new rules.

5.2 Interference

5.2.1 Metricom comments that the perception of "harmful interference" for unlicensed operations is outdated and inaccurate

5.2.2 The National Science Foundation's WFTP comments: "The central issue of potential interference between no-licensed radios designed under FCC rules, and with current technologies, has been dealt with decisively in theoretical studies and simulations...." "...interference potential for many bands of spectrum could become a practical non-issue...."

5.2.3 Millions of devices, including direct sequence spread spectrum radios with 1 Watt output power and antenna gains of 30 dBi, frequency hopping radios with omni-directional antennas and non-communication devices operating under Part 18 of the rules with no limit on radiated energy (Part 18.305), share the 2.4 GHz and 5.8 GHz ISM bands on an unlicensed, non co-ordinated basis. If harmful interference was such a big problem, these bands would have become unusable. MCA, with over four years of experience in the operation of unlicensed radios in the 2.4 GHz and 5.8 GHz ISM bands, does not know of one case of unacceptable interference being reported. Strong evidence that with the right rules, harmful interference becomes a non issue.

5.2.4 The reason given by the Commission for limiting range and radiated power, is to attempt to minimize a "tragedy of the commons." MCA believes that by attempting to minimize the unproven problem of interference caused by a "tragedy of the commons" the proposed rules will guarantee a real tragedy by limiting the range and radiated power to below market requirements.

5.2 Radiated Power Limits in the 5.10-5.35 GHz Band

An EIRP limit of -10 dBW is not compatible with the HIPERLAN standard of 0 dBW and will not help U.S. manufacturers compete globally. MCA believes the commission should maximize technical flexibility and promote global competition by setting a transmitter power limit of 1 Watt and limiting the EIRP to 0 dBW (1 Watt into a 0 dBi gain omni-directional antenna).

5.3 Radiated Power Limits in the 5.725-5.875 GHz Band

5.3.1 The proposed EIRP Limit of -10 dBW is Not Compatible with the Rule Making Objectives and is Unnecessary.

5.3.1.1 Limiting the EIRP to -10dBW will not allow NII/SUPERNet devices to create significant new wireless local area networks, will not facilitate wireless access to the National Information Infrastructure and will stifle, not stimulate, economic growth of new industries.

5.3.1.2 MCA believes the Commission should adopt a transmitter output power limit of 1 Watt, with the same power density requirements as spread spectrum radios operating under Part 15.247 of the Rules. This would have several advantages: a) NII/SUPERNet devices would be able to meet the markets communication distance needs; b) NII/SUPERNet devices would be operating with the same limits on power and power density as non-NII/SUPERNet devices, such as spread spectrum, and they would not cause any greater interference to an existing spread spectrum device than would be caused by another spread spectrum device; c) where possible, NII/SUPERNet devices would be capable of transmitting ten times the data thru-put of spread spectrum devices in the same bandwidth; d) users would be able to choose the best device for the job (NII/SUPERNet devices higher data thru-put, or spread spectrum devices higher level of interference immunity).

5.4 Spectrum Efficiency

MCA strongly supports efficient use of the spectrum. However, we agree with the commenting parties who correctly point out that modulation efficiency, measured in bits/Hz, is only one of the parameters that determines spectrum efficiency. MCA agrees that bits/Hz/unit area is a better measure of spectrum efficiency as it includes frequency re-use (antenna beam width and C/I performance).

Respectfully submitted

A handwritten signature in black ink, appearing to read 'Michael Mulcay', with a stylized, flowing script.

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